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Tackling Complex Issues with Integrated Assessment



upwellings

An upwelling occurs in a lake or ocean when strong, steady winds push warm in-shore surface water away from shore causing colder, nutrient-rich water to rise.

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COVER PHOTOS: TOP; MARSEE. BOTTOM, L. TO R.; LAPORTE, MARSEE, BRENNER, RANDALL COLTON, MARSEE, AIA



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Tackling Complex Issues

Integrated Assessment (IA) provides decision support for tackling the thorniest environmental issues where it is difficult to even define the problem, let alone potential solutions. These kinds of issues are in sharp contrast to simpler challenges where stakeholders agree on both the definition of the problem and its solution, or issues where stakeholders differ on the solution because multiple solutions are possible but where analysis, risk assessment, and optimization help identify the best solution. In the case of issues best suited to IA, standard analyses are not effective.

Michigan Sea Grant made a substantial and exciting programmatic shift three years ago to focus our research funds in support of IA projects addressing these complex issues in the state. This new focus has also enabled us to fully integrate research, outreach, and education around the topics we're addressing.

The process brings together decision makers, stakeholders, and researchers to review, interpret, and assess environmental, social, and economic information relevant to the issue. The result is a thorough, science-based study that outlines the causes of the issues, projects the consequences of maintaining the status quo, and identifies a series of potential actions—policy or management—that address the consequences. After scientific

and public review, the result is available to decision makers for selection of one or several of the actions for implementation. The big news, however, is that even before the ink on the assessment report dries, the process itself creates an environment whereby new partnerships and effective initiatives emerge. We're seeing that already in our first pilot study.

Over the past three years, Sea Grant has undertaken a pilot IA in northeast Michigan. There, concern over the need for sustained economic growth that does not impinge on excellent cultural and natural resources led the stakeholder group to identify maximizing access to the Lake Huron coast as the focus of their IA. The final project report is under review and the process itself has already surpassed expectations. This issue of upwellings highlights some of the many spin-off benefits that have occurred as a result. Also featured in this issue are three new IA projects funded by Michigan Sea Grant.



Donald Scavia

Michigan Sea Grant
Director



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Envisioning a Sustainable Future for Northeast Michigan

Known for many years as the “sunrise side,” Michigan’s northeast coastal region is rich in natural resources and home to many significant historic and cultural sites. Residents and visitors alike enjoy the region’s long stretches of undeveloped shoreline for hunting and fishing, visit the area’s network of historic lighthouses, and dive the many shipwrecks preserved in Thunder Bay.

Capitalizing on these regional assets while maintaining a sense of place and community character was the focus of the Northeast Michigan Integrated Assessment (NEMIA), a collaborative project supported by Michigan Sea Grant. The goal of the region-wide effort was to examine ways to enhance sustainable tourism and economic opportunity in the three-county region that includes Presque Isle, Alpena and Alcona counties.

“Our goal was to work with the region in developing strategic and research-based opportunities to leverage these coastal resources for their tourism and economic values,” explains Michigan Sea Grant Extension Educator Brandon Schroeder, “while considering how we can plan for and protect the integrity of these resources and our local quality of life that is defined by these important coastal resources.”

Coastal Access, Tourism and Economic Development

The past few decades have been economically challenging for the northeast region due to a combination of factors including high unemployment attributed in part to lost jobs in mining, manufacturing and agriculture, as well as the closure of a U.S. Air Force base. In recent years, some of the traditional hunting and angling tourism base has also fallen.

To address these challenges, representatives from 32 local and regional organizations met regularly as part of the NEMIA project, which began in 2005. The meetings were convened by Northeast Michigan Council of Governments (NEMCOG) and held at Thunder Bay National Marine Sanctuary in Alpena.

Together, participants agreed to frame the assessment around the following policy question: How can coastal access be designed, in a regional context, for sustainable tourism that stimulates economic development while maintaining the integrity of natural and cultural resources, and quality of life?

To provide baseline information, collaborating researchers conducted five technical assessments to characterize the status of life in northeast Michigan. Assessments include socioeconomic, ecological, cultural, planning and zoning, and sustainable design. The sustainable design assessment was one of eight projects chosen nationwide to be conducted by the American Institute of Architects’ Center for Communities by Design.

Additional research collaborators included Michigan State University Extension, University of Michigan School of Natural Resources and Environment, UM Department of Urban and Regional Planning, National Oceanic and Atmospheric Administration, National Marine Sanctuary Program, and The Nature Conservancy.

Identifying Priorities

Complementing the research, NEMIA stakeholders explored several case studies, two from the United States and one from Australia, where similar challenges and opportunities have played out. They also provided input to collectively develop a vision for the region. Several policy theme areas, with a suite of potential actions identified with each theme, emerged as priorities:



SUSTAINABLE FUTURE

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- Preserving a sense of place and community character
- Natural/cultural/maritime heritage and resources tourism
- Growing an entrepreneurial community and attracting business interests
- Government coordination and communication
- Incorporating modern technologies

These guiding principles helped provide a framework for the technical assessments, which are undergoing peer-review. Following peer-review, the assessments will be incorporated into a final document



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“It brought the three counties together to help take a look at the needs, to broaden our focus and realize that what we have in common is greater than what separates us,” says Styer.

Huron Blueways Project

NEMIA provided a grass roots process that led to successful MDEQ Coastal Management Program funding of a project coordinated by NEMCOG to identify coastal access points, water routes and other amenities from Mackinac to Harrisville in an effort to enhance recreational opportunities for paddlers along northern Lake Huron.

“NEMIA brought more recognition to this large coastal area to try to build upon but not spoil what’s there,” notes Richard Deuell of NEMCOG. “Anytime we can bring communities together to interact and discuss a common resource is always a plus.”

Regional Coastal Tourism Survey

Marine Sanctuary staff and NEMCOG are partnering with other NEMIA work group members to conduct a study to gather

tourism data that are current, specific and relevant to northeast Michigan. Some of the ongoing initiatives in the northeast region include the US 23 Heritage Route Initiative, Huron Greenways, Sweetwater Trails, and development of Northeast Michigan as a Maritime Heritage Tourism Destination through the Michigan Department of History, Arts and Libraries.

Great Lakes Stewardship Initiative Funding

The northeast region received \$5,000 in funding from the Great Lakes Fishery Trust to support Great Lakes place-based education. This initiative engages schools and student learning through projects that provide coastal resources stewardship and community benefit. The NEMIA work group supported this proposal, and several work group members offered to help schools and students engage in coastal projects identified through NEMIA discussions.

Coastal Tourism Business Support Website

In its own commitment to implement the prioritized actions identified through the NEMIA process, Michigan Sea Grant is investing funding to develop a web-based clearinghouse or “toolbox” designed to provide targeted support to emerging entrepreneurs interested in eco- or cultural coastal tourism in the region. Businesses will have access to regionally relevant economic development and business start-up tools, tourism development and marketing products, agency resource protection strategies and plans, and “best practices” examples from existing coastal businesses successfully operating within the region.

See: www.miseagrant.umich.edu/nemia

presenting policy options, potential actions, or legislative tools that will help the region realize its vision for a sustainable future.

New partnerships and collaborations have already emerged as a result of the NEMIA process. The following activities are among the highlights.

State Parks Planning Process

NEMIA served as a catalyst for the Michigan Department of Natural Resources to develop regionally coordinated management plans for Negwegon, Rockport, and Thompson’s Harbor state parks. In addition to developing individual management plans for each park, the MDNR will develop a regional plan for all three properties with input from a newly formed citizen advisory committee made up of local residents. “NEMIA encouraged us to look at planning beyond the individual park basis,” notes Paul Curtis of the MDNR. “It made sense in this instance and has led to similar planning for three parks in southwest Michigan.”

Creating Entrepreneurial Communities (CEC) Initiative

NEMIA helped position a team from northeast Michigan to be selected as a CEC Pilot Community, a regional economic development opportunity supported by Michigan State University Extension and the MSU Product Center. Economic development consultant Bethany Styer was among the four people chosen to represent the three-county region in intensive five-day training focused on energizing entrepreneurs. Now certified to train others, Styer says the NEMIA process emphasized the positive benefits of thinking on a regional level.



SWINEHART



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Causes, Consequences and Correctives of Fish Contamination in the Detroit River

Despite signs of recent ecosystem improvement, the Detroit River remains under several fish consumption advisories. In technical terms, the advisories are categorized as “beneficial use impairments” that impact both human health and affect economic revenue.

While these advisories are critically important, says University of Michigan (UM) research scientist Donna Kashian, little progress has been made in developing effective management strategies, and many uncertainties exist regarding the “drivers of these advisories.”

“Despite the importance of these advisories to people who use the Detroit River, and given the large amounts of money spent on contaminant remediation, there are still many things we do not know about the causes of, and human health risks associated with, these advisories,” says Kashian. “Some of the biggest scientific uncertainties include the impact of fish movement within the river and between Lake Huron and Lake Erie on contaminant levels found in Detroit River fish, the role of specific contaminated sites in driving the advisories, and health impacts to vulnerable populations who consume large amounts of fish from the river.”

With support from Michigan Sea Grant, Kashian is leading an integrated assessment to investigate the issues affecting fish consumption advisories on the Detroit River. The project focuses specifically on the reasons why fish contamination advisories for PCBs are issued when they are.

Over the next two years, Kashian and her team will conduct scientific assessments that synthesize and summarize the status and trends of fish contaminant levels and advisories in the Detroit River; and describe the causes and consequences of fish consumption advisories, with an emphasis on model simulation and explanatory analysis.

They’ll also identify the key uncertainties regarding consumption advisories for use in research, monitoring efforts, and in management and policy directives. A final aspect of the project will be to provide technical guidance in implementing policy and management options.

In keeping with the collaborative nature of integrated assessments, the Detroit River project will bring together policy-makers, scientists, interested stakeholders, and governmental agencies from both Canada and the United States. See sidebar at right.

Solutions for eliminating fish consumption advisories, according to project researchers, will likely require novel approaches directed at both decreasing contaminant levels in fish over the long term and reducing human health risks in the short- and long term.

Stakeholders Play Key Role

Representatives from 28 organizations gathered in November 2007 at the first stakeholder workshop held as part of the Detroit River project.

The purpose of the workshop was for stakeholders to gain a greater awareness of the system surrounding contaminants and their human health effects in the Detroit River.

Participants identified what they believed to be the top five issues that most need to be addressed with respect to consumption advisories in the Detroit River.

Workshop attendees came from both the U.S. and Canada, representing federal, state, regional and local government agencies, as well as non- and for-profit community groups. In addition, State Representative Kathleen Law (D-MI) participated in the process, while U.S. Congressman John Conyers, Jr. (D-MI) and Carolyn Kilpatrick (D-MI) also attended.

See: www.ciler.snre.umich.edu/fca

Ultimately the Detroit River project will help protect the health and safety of the people who fish on the Detroit River, the ecosystem, and the economy that depends on fishing.



STORMWATER MANAGEMENT



PHOTOS COURTESY ANNIS WATER RESOURCES INSTITUTE



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Stormwater Management

Located just inland from Lake Michigan, Spring Lake Township and the Village of Spring Lake enjoy a picturesque waterfront setting adjacent to the seven-mile long Spring Lake. Yet this attractive location also poses challenges, particularly after heavy rains.

On these occasions, stormwater runoff carries pollutants into Spring Lake and its main tributary streams, Norris and Crockery creeks. It then flows downstream to the nearby Grand River and eventually into Lake Michigan, where it impairs nearshore water quality and threatens aquatic life.

With support from Michigan Sea Grant, Alan Steinman of Grand Valley State University's Annis Water Resources Institute is leading an integrated assessment to investigate stormwater issues in Spring Lake Township, the Village of Spring Lake, and neighboring communities.

"Stormwater is quickly gaining recognition as one of the most important water quality problems in urbanizing landscapes," says

Steinman. "The Village of Spring Lake and Spring Lake Township are perfect laboratories for our integrated assessment."

As increasing amounts of land are converted to buildings, roads, parking lots, roof tops, and driveways—also known as impervious surfaces—water that was once absorbed naturally into the soil now flows into storm drains, pipes and canals, and ultimately into nearby surface waters. Stormwater runoff increases pollutant loads and raises water temperatures, which adversely impact water quality and the health of fish and other aquatic life.

"Stormwater is quickly gaining recognition as one of the most important water quality problems in urbanizing landscapes."

High levels of phosphorus are a particular problem. In the past, excess nutrients have resulted in algal blooms, including the potentially toxic cyanobacterium (blue-green alga) *Microcystis*, which some residents have called "green paint." After the algae die off, they sink to the bottom and decompose, which can result in very low dissolved oxygen concentrations and potential fish kills.

In addition to phosphorus, stormwater runoff introduces other nutrients and nonpoint source pollutants including sediments, oil, metals, and road salts. Historically, these pollutants have resulted in the impairment of the waters of Spring Lake, the Grand River, and the nearshore

areas of Lake Michigan. Beach closings, no-contact (to water) advisories, and lost recreational opportunities have become more common. In addition, notes Steinman, pressures associated with increasing development in the Spring Lake area have magnified the stormwater issue.

Despite these challenges, Steinman cites the wealth of existing environmental information about the region that will help researchers conduct the integrated assessment.

In addition, the IA will engage community residents to ensure that potential resource management options are realistic from a practical and political standpoint. A series of public meetings will begin in March 2008.

Specific objectives of the integrated assessment are fourfold: 1) increase general knowledge among residents and decision-makers about stormwater issues in the community; 2) increase stewardship of local water resources; 3) identify inconsistencies between state regulations and/or local ordinances that can improve local stormwater management and control; and 4) provide a suite of alternative stormwater management Best Management Practices (BMPs) tailored to Spring Lake Township and the Village of Spring Lake.

"It is our hope that both our integrated assessment process, as well as the outcomes, will serve as a model for other communities experiencing similar problems," says Steinman.



COASTAL BROWNFIELDS

PHOTOS COURTESY WELSH, JONES

Coastal Brownfield Redevelopment

One result of Michigan’s industrial heritage is a significant number of brownfield sites, or vacant, abandoned or underutilized properties that may contain hazardous or toxic substances. Hundreds of these sites are located in the Great lakes coastal region.

Environmental factors alone make redevelopment efforts difficult and expensive. Yet when social, economic, and public policy questions join the mix, the process grows increasingly complex. With support from Michigan Sea Grant, a team of researchers from Eastern Michigan University (EMU) is conducting an integrated assessment of coastal brownfield redevelopment in Michigan to learn what approaches have led to successful redevelopment and how these strategies can be incorporated into future redevelopment efforts.

“Waterfront property offers unique coastal recreational opportunities,” says Jones, “as well as potential for development of residential areas or improved coastal access.”

Led by EMU professors Robert Jones and William Welsh, the project will focus specifically on coastal brownfield redevelopment efforts that have received state funding during the last 20 years. While some brownfield projects are financed by private developers, community organizations, or local partnerships,

others proceed with financial support from programs administered by the Michigan Department of Environmental Quality (MDEQ).

This state funding is typically only a small portion of the actual remediation and redevelopment costs and is used to help “level the playing field,” explains Jones, so that brownfield projects can more evenly compete with the costs for greenfield projects (new developments). By redeveloping existing waterfront sites, communities can make the best use of valuable coastal locations.

“Waterfront property offers unique coastal recreational opportunities,” says Jones, “as well as potential for development of residential areas or improved coastal access.”

Researchers will conduct a scientific assessment of the economic, social, environmental, and public policy aspects of coastal brownfield redevelopment. As a first step, they’ve acquired a database of coastal brownfield projects from the MDEQ. They’ll combine this information with additional data sources including environmental assessment reports, site visits, and information from local communities and stakeholders.

Interviews with stakeholders will be conducted with those involved in

cleanup and redevelopment efforts. Specific goals are to identify the role of stakeholders in determining the success of brownfield redevelopment projects; ascertain the assets and barriers to coastal brownfield redevelopment associated with various stakeholder groups; and create potential alternative coastal brownfield redevelopment policy scenarios based on stakeholder insight.

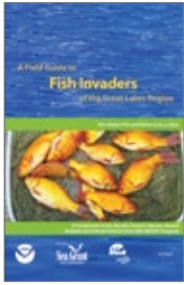
Information will be entered into a geographic information system (GIS). Using GIS, decision analysis theory, and various computer algorithms, the research team will develop a spatial decision support system to help evaluate project data against different redevelopment possibilities and alternative policy scenarios.

The outcome will be a user-friendly system that will enable policy makers, managers and stakeholders to more effectively accomplish the goals of coastal brownfield redevelopment, and provide a model system that could be adapted for use in other redevelopment efforts throughout the Great Lakes region.

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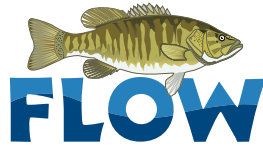
RESOURCES FOR GREAT LAKES EDUCATION AND RESEARCH



A Field Guide to Fish Invaders of the Great Lakes Region

By Jesse Anderson, Douglas A. Jensen,
Jeffrey L. Gunderson and Marie Zhuikov,
Minnesota Sea Grant

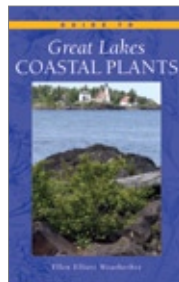
This waterproof, pocket-sized guide highlights harmful invasive fish found in the Great Lakes region. Similar-looking native fish are included for comparison. Designed to help anglers and fisheries personnel identify and report potentially invasive fish species. Also accompanies AIS-HACCP training workshops and materials. 20 pages.



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Guide to Great Lakes Coastal Plants

By Ellen Elliott Weatherbee

This definitive guide features 67 of the most interesting plants found along the Great Lakes shoreline. Each plant is described in simple, authoritative language and illustrated with photographs and line drawings. Also includes distribution maps. Perfect for naturalists, weekend botanists, and anyone interested in learning about coastal plants and the fragile ecosystem that supports them. Produced by the University of Michigan Press and Michigan Sea Grant. 180 pages.

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